Confirmation No. 1784

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	VAN DAL *et al.*	Examiner:	Ingham, John C.
Serial No.:	10/575,288	Group Art Unit:	2814
Filed:	April 11, 2006	Docket No.:	NL031259US1 (NXPS.548PA)
Title:	SEMICONDUCTOR DEVICE AND METHOD OF MANUFACTURING SUCH A SEMICONDUCTOR DEVICE		

REPLY BRIEF

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Customer No. 65913

Dear Sir:

This is a Reply Brief submitted pursuant to 37 C.F.R. § 41.41 for the above-referenced patent application. In this Reply Brief, Appellant maintains the arguments set forth in the Appeal Brief filed May 12, 2009 and addresses the Examiner's Answer mailed July 15, 2009.

Appellant maintains that the rejection of claims 1-2, 4-6 and 8-13 should be reversed.

I. Status of Claims

Claims 1-2, 4-6 and 8-13 stand rejected and are presented for appeal. Claims 3 and 7 are cancelled.

II. The grounds of rejection to be reviewed on appeal are as follows:

A. Claims 1-2, 4-6, 8 and 10-13 stand rejected under 35 U.S.C. § 103(a) over the Wang reference (U.S. Patent No. 5,686,324) and a "Chao" reference (no citation given).

B. Claim 9 stands rejected under 35 U.S.C. § 103(a) over the Wang and Chao references in further view of a "Yu" reference (no citation given).

III. Appellant's Reply Argument

1. The Proposed Modification Of The '324 Reference Undermines The Purpose Of The Reference

In the Appeal Brief, the Appellant argued that all § 103(a) rejections are improper because modifying the '324 reference to include the self-aligned silicide (salicide) of the '715 reference adds multiple etch/formation steps that separate the combined steps therein, and thus undermines the reference's purpose of combining etch/formation steps. *See, e.g.,* M.P.E.P. §§ 2143.01("If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious."); *see also In re Gordon*, 733 F.2d 900 (Fed. Cir. 1984) (a § 103 rejection cannot be maintained when the asserted modification undermines purpose of the main reference). As consistent with the above, the '324 reference also teaches away from the silicide approach in the '715 reference, as combined in an attempt to arrive at the claimed invention. *See, e.g., KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1742 (U.S. 2007) ("when the prior art teaches away from combining certain known elements, discovery of a successful means of combining them is more likely to be non-obvious.").

In response, the Examiner's Answer offers an unrelated argument that "the '324 reference does not teach away from an additional silicide step" and further that "[o]ne such remaining process step may obviously be the silicide contact formation as taught by Chao." However, carrying out an *additional* silicide step at the end of some process is not how the proposed modification operates. Instead, as established in the record and summarized below, the proposed modification would require that the combined steps of the '324 reference be separated and otherwise modified to include a silicide step, which would vitiate the '324 reference's combined via/contact formation. More particularly, the '324 reference requires that insulating layers be formed over gate and source/drain regions prior to the formation of source and drain contacts (*see*, *e.g.*, NSG and BPSG layers in cited FIG. 19 and related FIG. 22). The '324 reference combines the step of forming source/drain contacts with the step of forming vias 252 in the insulating NSG and PBSG layers (*see* FIG. 22) to achieve its purpose, for example, by etching vias 252 and preparing the source/drain regions for contacts in a process where "the top surface of each source/drain region is 'cleared' from oxides before applying contact metallization" (*see*, *e.g.*, column 8:54-57).

In order to modify the '324 reference as asserted, the proposed combination would add steps to remove oxide from the respective gate, source and drain in order to prepare these regions for saliciding. Ostensibly, additional steps would then be carried out to form a metal contact layer. Such additional steps, where the '324 reference already provides contact regions (as part of via formation, using fewer steps) and expressly identifies its purpose as avoiding such additional steps, is contrary to the M.P.E.P. and relevant law.

To date, the Examiner has failed to provide any explanation as to how the '324 reference could operate in accordance with its purpose when modified as asserted. The Examiner's Answer is also silent as to the removal of the stated purpose of the '324 reference, or as to any rationale in support thereof. Accordingly, the proposed modification not only renders the '324 reference inoperable for its purpose, it contradicts the M.P.E.P. and relevant law as the '324 reference teaches away from the additional (inter-process) steps for forming self-aligned silicide. Appellant therefore requests that the rejections be reversed.

2. The Rejection Of Claim 9 Should Be Reversed Because No Reference Has Been Cited As Corresponding To Claim Limitations Or In Support Of What One "Could Have Combined," And The Asserted Requirements Of "Criticality" Are Contrary To The M.P.E.P. And Applicable Law

The § 103(a) rejection of claim 9 is improper because it fails to cite any correspondence to ion implantation using a flux as claimed, and because it relies upon an assertion of what one of skill in the art "could have combined" without providing any reference or other evidentiary support. The rejection thus fails to show correspondence under § 103, and further impermissibly relies upon an "obvious to try" argument, which has been established as improper under the M.P.E.P. and relevant law. *See, e.g.*, M.P.E.P. § 2143 and *In re Kubin*, 561 F.3d 1351 (Fed. Cir. 2009); *see also Gillette Co. v. S.C. Johnson & Son, Inc.*, 919 F.2d 720, 725 (Fed. Cir. 1990) ("we have consistently held that 'obvious to try' is not to be equated with obviousness."). Interpreting *KSR*, the *Kubin* court explained that the "obvious to try" standard under § 103(a) may not be applied where one would have "to vary all parameters ... where the prior art gave either no indication of which parameters were critical ..." or "where the prior art gave only general guidance as to the particular form of the claimed invention or how to achieve it" (quoting *In re O'Farrell* 853 F.2d 894, 903 (Fed. Cir. 1988).

In this instance, the asserted combination asserted would, at best, lead to open-ended speculation on how a hypothetical embodiment would operate, which the *Kubin* court has expressly indicated as improper. Specifically, the evidence of record does not indicate that any reference provides any direction as to how the skilled artisan would modify the '324 reference to include the indicated ion implant energy used in the '176 reference, or to select a range as claimed, relative to that disclosed in the '176 reference. Nothing in the record evidences support of the assertion that one of skill in the art would be motivated to modify the '324 reference to include the indicated ion implant energy used in the '176 reference, or supports the assertions (in the Examiner's Answer) that there would be "no change in their respective functions" (of the '324 reference) and that the combination would yield "no more than predictable results." All of these assertions are devoid of any factual basis. Moreover,

no explanation has been provided as to how the '324 reference could operate under such conditions.

The Office Action's requirement that the Appellant demonstrate "criticality" or "unexpected results" is also improper and inapplicable where no *prima facie* case of obviousness has been presented. For instance, according to M.P.E.P. § 2144.05, such assertions of a lack in criticality of ranges are applicable only where the prior art discloses the relevant conditions without specificity. This is also consistent with case law cited in M.P.E.P. § 2144.05, in which such assertions of lack of criticality are based upon cited art that discloses related ranges (*see, e.g., In re Aller*, 220 F.2d 454, 456 (1955) (a process performed at a temperature between 40°C and 80°C held obvious over a reference which differed in that the reference process was performed at a temperature of 100°C). As applicable here, the Office Action has not asserted that any reference discloses the claimed ion implantation with regard to any range or in any range of energy and flux, much less any such range as relevant to the claimed invention.

In view of the above, the Section 103 rejection of claim 9 is improper and Appellant requests that it be reversed.

3. The Cited Combination Does Not Disclose All Claim Limitations

The Section 103 rejections are also improper because they fail to provide teaching or suggestion of all claim limitations, including those in claim 2 as directed to a recessed silicide contact at a source and drain region, and to a similar contact at a gate region, where "the connection region is recessed in the semiconductor body." The Examiner's Answer appears to acknowledge that the cited '715 reference fails to disclose a recessed silicide contact (in the context of the claimed invention), then goes on to suggest that the claims do not preclude "a portion from extending above the surface." However, this asserted interpretation is contrary to the claim limitations, which specifically require that the "connection region" (*e.g.*, an upper portion of a contact to which connection is made) is recessed. Referring to Appellant's FIG. 1 (copied below for convenience), recessed silicide regions 2B and 3B (see also paragraph 0021) are formed such that the contact (upper portion of these regions) is at the surface of the shown device.

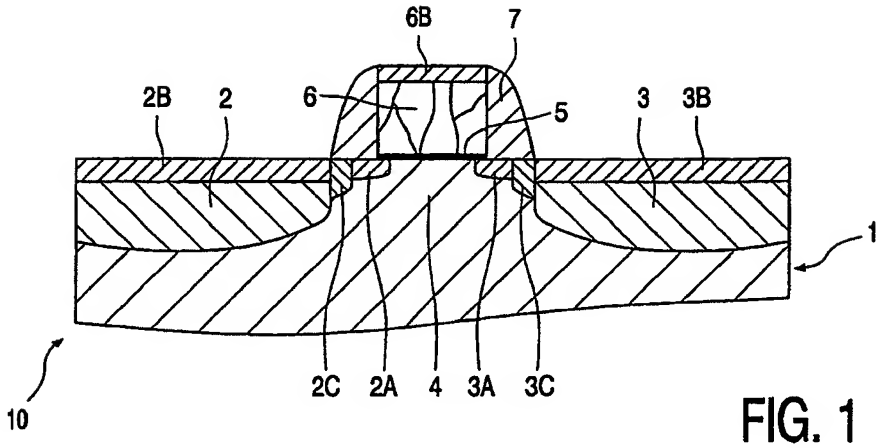
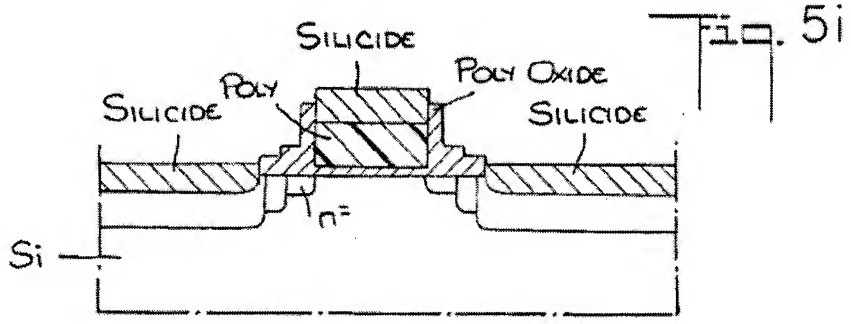


FIG. 1

In contrast, the cited portions of the '715 reference (FIG. 5i, also copied here for convenience) show a silicide region that extends well above the surface of all three of the gate, source and drain, with a connection region that lies above the surface of the semiconductor body.



Accordingly, the silicide region in the '715 reference does not disclose a recessed connection region as claimed and thus fails to correspond to related claim limitations such as those in claim 2. Appellant therefore requests that the § 103 rejections be reversed.

4. **All Rejections Must Be Reversed Because The Office Actions Failed To Timely Identify The "Chao" and "Yu" References**

The cited "Chao" and "Yu" references as part of "new grounds of rejection" in the Final Office Action were not identified prior to the Advisory Action, thus failing to afford the Appellant an opportunity to assess and respond to the rejections as required under the M.P.E.P. and relevant law. The Examiner's Answer attempts to subvert these requirements in asserting that the references have now "been made of record" based upon the Appellant "reproduces the relevant figures." However, the fact that Appellant has attempted to address the rejections and that previous rejections had listed "Chao" and "Yu" references does not remove the aforesaid requirements that the rejection clearly identify the rationale (and cited references) upon which the Examiner is relying. Accordingly, should any claims not be allowed, Appellant requests that the rejections be reversed, that prosecution be reopened and further that the Appellant be afforded an opportunity to further assess the rejections and to respond thereto.

IV. Conclusion

In view of the arguments presented above and those arguments presented in the Appeal Brief, Appellants submit that the rejections are improper, the claimed invention is patentable, and that the rejections of claims 1-2, 4-6, 8 and 10-13 should be reversed. Appellants respectfully request reversal of the rejections as applied to the appealed claims and allowance of the entire application.

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